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Risks and complications in rhinoplasty. A comparative study in structural vs preservation rhinoplasty

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ABSTRACT

Introduction. Rhinoseptoplasty is considered the most challenging operation because many techniques have to be taken into consideration to achieve an optimal aesthetic and functional results. Rhinoseptoplasty techniques have been perfected over time, following two main surgical approaches: structural rhinoplasty (resection/ reconstruction) and conservative (preservation rhinoplasty).
Methods. The authors present the risks and complications in a comparative study of 100 cases with patients in primary rhinoseptoplastyplasty performed between 2019-2021: 50 cases in Structural Rhinoplsty and 50 cases in Preservation **Rhinoplasty.** The study presents two surgical concepts of rhinoplasty regarding the main advantages, disadvantages and indications of each type of rhinoseptoplasty surgery.
Results and conclusions. Complications post-rhinoseptoplasty can be considered as perioperative, functional, anatomic (aesthetic) and psyhological. In this study 10 cases (10%) of primary rhinoplasty required revision surgery. The most frequent postoperative deformity is the "pollybeak" when a deep naso-frontal angle, cartilaginous hump and reduced tip projection are present preoperatively. The pollybeak was the indication in 4 cases (40%) of all revision rhinoplasties. Other frequent postoperative deformities are: wide nasal tip, retractions of the columella base and irregularities of the nasal dorsum. These deformities are very often combined and caused by a loss of septal support. Septorhinoplasy is a difficult procedure and the surgeon must have accurate anatomical knowledge and rich clinical experience. The risks for rhinoplasty-complications can be reduced with increasing experience. It is very important to make distinction between complication and mistake.

Keywords: structural rhinoseptoplasty, preservation rhinoseptoplasty, rhinoseptoplasty complications, nasoseptal deformation, primary rhinoplasty

INTRODUCTION

Nasoseptal deformations are alterations of shape and position (lateral deviation) or development problems, in deficit (hypoplasia) or in excess (hyperplasia), with functional and aesthetic prejudice [1,2]. Rhinoseptoplasty is the surgery that changes the shape, size and proportion of the nose. The motivation and results of the rhinoseptoplastic surgery are anatomical (aesthetic) and functional (improve breathing) [3]. Primary rhinoseptoplasty procedures were continuous improved, and have two main surgical approaches: structural rhinoplasty (resection/ reconstruction) and conservative (preservative rhinoplasty) [2,4]. Structural (traditional) rhinoseptoplasty uses surgical technique with external (open technique) or internal (closed technique) incisions and refers to resection of the bones, cartilages and skin, reconstruction, reshaping of the nose structure, use of additional bone, cartilage, skin grafts. Preservation rhinoplasty refers to the preservation of several anatomical structures, including the nasal bones, lateral cartilage, nasal ligaments and use more closed techniques. The used technique for this type of rhinoseptoplasty is "push-down" or "let-down" [5]. Preservation techniques can prevent the destruction of the K area (keystone region), the collapse of the lateral cartilage and the stenosis of the nostrils. Zone K is located at the junction of the nasal bones, the superior lateral cartilage, the quadrilateral cartilage, and the perpendicular

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blade of the ethmoid [6,7]. The importance of the stability and structure of the nose is given by the number of complications that can arise from the poor handling of this area. Compared to the structural rhinoseptoplasty techniques in which the nasal dorsum is removed by resection techniques, which required revisions and the use of grafts, the technique of preserving minimizes the need for revision [8]. Septorhinoplasty is a difficult procedure and the surgeon must have accurate anatomical knowledge and rich clinical experience. The risks for rhinoplasty complications can be reduced with increasing experience. It is very important to make distinction between complication and mistake [9,10].

METHODS

The authors present risks and complications in a comparative study of 100 cases with patients in primary rhinoseptoplasty performed between 2019-2021. In this study, 50 cases were distributed in Structural Rhinoplasty and 50 cases in Preservation Rhinoplasty. In all 100 cases Primary Rhinoseptoplasty was performed. All the patients in this study present different forms of deviated septum. The study presents two surgical concepts of rhinoplasty, structural and preservation, regarding the main advantages, disadvantages and indications of each type of rhinoseptoplasty surgery. The technique of preserving the nasal dorsum can be performed under closed approach. The used technique for this type of rhinoseptoplasty was "push-down" in 25 patients and "let-down" in 25 patients. All the patients have easy forms of deviated septum.

RESULTS

Classification of complications in rhinoseptoplasty cases

Complications of rhinoseptoplasty can be classified as follows: (1) perioperative, (2) anatomic (aesthetic), (3) functional, (4) psyhological (Fig.3).

Perioperative complications

Vascular complications include septal hematoma and epistaxis (bleeding).

Septal hematoma. In our study there were 3 cases with septal hematoma (2 cases in Traditional Rhinoplasty (TR) patients and 1 case in Presevation Rhinoplasty (PR) pacients). Septal hematoma can occur secondary in septorhinoplasty. Anterior rhinoscopy reveals a septal mass that occludes one or both nasal fossae. The treatment consists of hematoma drainage, nasal tampons to impede recidivism and antibiotic therapy to avoid abscess transformation. Septal abscesses can evolve to mucosal and/or cartilage necrosis and septal perforation [11].

Epistaxis. In this study was 10 cases experienced epistaxis (7 in TR patients and 3 in PR patients). In rhinoplasty patients, bleeding intra- and post-operatively is normal if it is limited but can become a complication if it is continuous and profuse. For the risk patients the treatment with anticoagulants or anti-aggregating agents is recommended. Also, a delicate technique during surgery should be used in order to avoid vascular problems. Epistaxis therapy includes nasal packing and endoscopic procedure to coagulate the sphenopalatine septal and lateral branches

Traumatic complications

Rhino-liquoral fistulas. No patient had traumatic complications in this study. The major intracranial complication it is possible to occur post-rhinoplasty. The superior portion of the septal bone is directly abutting the cribriform lamina of the ethmoid and is the direct continuation of this structure. In septoplasty, the surgeons must not treat the septum aggressively. Prevention of rhino-liquoral fistulas consists of an accurate and delicate septum dissection.

Epiphora (lacrimal duct injury). In this study there were 10 cases (7 in TR, 3 in PR) with transition ephifora caused from the nasal tampon. Epiphora is an extremely rare complication after rhinoplasty. Damage of the lacrimal ducts is possible when the lateral osteotomy direction is incorrect. It is frequently clinically confused with paralateronasal edema [12].

Blindness. No patient had blindness. The etiopathogenesis of blindness is given by an embolic occlusion or spastic response of the central retinal artery in nasal dorsum steroid injections or vasoconstrictor injections in the septum and turbinates [3].

Dental Trauma. 20 TR patients and 10 PR patients experienced dental trauma. Hypoanesthesia of the superior central incisors and palatal premaxilla is frequently noted in the post-operative period after septorhinoplasty. This is due to the fact that the incisive nerve arises when the septal dislocations close to the anterior nasal spine, nasal septum cartilage resections or anterior nasal spine remodeling procedures are completed. Spontaneous resolution of the hypoesthesia occurs between 1 week and 6 months.

Skin necrosis. No cases with skin necrosis were identified. Nasal skin necrosis is the worst complication during a septorhinoplasty. It can be caused by vascular damage in the vessels that supply the nose tip, excessive dressing compression after damage in the lateral nasal arteries due to an incorrect plane of dissection, excessive nose tip fat tissue reduction, the post-operative use of dermal fillers at the nasal pyramid, nasolabial folds or paranasal region to camouflage irregularities. This complication causes direct vessel damage and intravascular occlusion or indirect vascular compression, tip vascularity. To prevent this complication there are some rules that should be respected: avoid injecting fillers with sharp needles, dissect the nasal tissues without getting superficial, avoid defatting techniques of the nose tip, avoid firm and tight dressings. Treatment of skin necrosis consists in a complex reconstruction procedure with local, regional or free flaps [13].

Nasal septal perforation. Five patients had this complication (4 in TR and 1 in PR).

Anatomic (Aesthetic) Complications in Primary Rhinoseptoplasty

The nose can be divided in: lower third (soft tissue triangles, columella, lobule, alae), middle third (lower portion of the dorsal, upper-lateral cartilage, dorsal septum), upper third (upper portion of the dorsal-nasal bones, and their connection to the septum, frontal bone and maxilla). In this study, the

lower third of the nose is the most frequent site of deformity after primary rhinoplasty. There were 32 cases (22 cases in Traditional Rinoplasty and 10 cases in Presevation rhinoplasty) with deformity of the lower third of the nose, 20 patients with deformity of the middle third of the nose (15 patients in TR cohort and 5 cases in the PR cohort), and 16 patients with the upper third deformity (11 in TR cohort and 5 in PR cohort).

The complications of primary rhinoseptoplasty can be divided into major and minor deformities. In our study with 100 cases, the most common major anatomic (aesthetic) deformities after primary rhinoplasty are were as follows: pollibeak occurred in 10 patients (8 TR, 2 PR), saddle nose in 9 cases (TR 9, PR 0), middle vault asymmetry or "V" Inverted in 10 cases (10 TR, 0 PR), and retracted columella in 5 cases (5 TR 5, 0 PR). The most minor complications are: bossae in 16 cases (11 TR, 5 PR), irregular dorsum in 17 cases (15 TR, 2 PR), hanging columella in 11 cases (10 TR, 1 PR), wide nasal base in 6 cases (6 TR, 0 PR).

Projection of the nasal tip is a function of tip support mechanisms. The mechanisms that affect nasal projection were: overprojection in 15 cases (15 TR, 0 PR), underprojection in 12 cases (10 TR, 2 PR). Tip rotation relates to the tripod structure of the nasal tip. Overrotation of the nose may result from the lateral crura or caudal septum. In our study 8 cases (TR 5, PR 3) had overrotation. Underrotation (ptotic tip) is caused by disruption caudal septum and medial crura (medial component of the nasal tripod). In this study there were 5 patients (TR 5, PR 0) with underrotation. Other complications were: tip asymmetriy – 10 cases (TR 8, PR 2), alar retraction – 7 cases (7 TR, 0 PR). The middle vault asymmetry caused dislocation of the upper lateral cartilages, uncorrected septal deviation and improperly dorsal spreader grafts. 10 patients had pollibeak (amorphous tip caused by overresection of dorsal septum) (8 TR, 2 PR). In 4 of the cases with pollybeak nose revision was performed. Inverted "V" deformity formed at the junction of the middle and upper vaults was caused by reduction of the cartilaginous hump and was identified in 10 cases (10 TR, 0 PT). In 3 of these cases, revision was performed.

Revision Rhinoplasty. In this study 10 cases required revision rhinoplasty and pollybeak was the indication in 4 cases (40%) (3 TR, 1 PR) of all revision rhinoplasties. Other postoperative deformities that required revision were: inverted V deformity - 2 cases, wide nasal tip - 1 case, retractions of the columella base - 1 case, and irregularities of the nasal dorsum - 2 cases (1 TR, 1 PR) (Fig.2).

Ten patients required revision rhinoplasty in both cohorts (20% from PR and 80% from TR) (Fig.1).

Functional complications

Respiratory Complications

In this study 23 cases had respiratory complication (18 T and 5 PR). The complications were: 10 TR patients with internal nasal valve dysfunction, 8 patients with external nasal valve dysfunction, 3 patients with collapse alar and 5 patients with residual anterior septal deviation associated with turbinate hypertrophy.

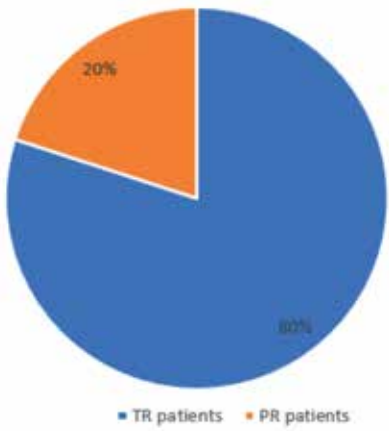

FIGURE 1. Cases that required revision rhinoplasty

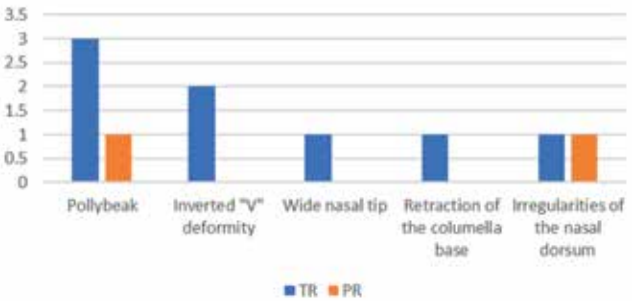

FIGURE 2. Indications for revision rhinoplasty

Internal nasal valve dysfunction. The internal nasal valve angle is formed by the confluence of the nasal septum medially and lateral cartilages externally; the normal value is around 15° [14]. Over-resection of the lateral cartilages during hump removal, scarring in the internal valve area, a dorsal inverted V deformity appear after the resolution of the surgical edema due to inferomedial collapse of the triangular cartilages [15].

The remedy for this type of complication is the placement of a spreader graft.

External nasal valve dysfunction. The external nasal valve is an area defined three-dimensionally by the inferior turbinate head, caudal portion of the triangular cartilages, cephalic portion of the alar cartilages and septum. The post-rhinoplasty dysfunction is related to an excessive resection of lateral crura of the alar cartilages. Complications of the external nasal valve dysfunction can be nasal alar collapse that can be corrected with alar battengraft, narinalstenosis that can be resolved with local flaps in Z-plasties. Residual anterior septal deviations and turbinate hypertrophy can cause external nasal valve dysfunction also [16]. Structural rhinoplasty can reduce area of the nasal airways. Hyposmia after rhinoplasty is temporarily in most cases caused by the swelling of the mucosa. It is only found by testing and not even realized by the patient [17]. A permanent anosmia is rare [18]. In our cohort, 15

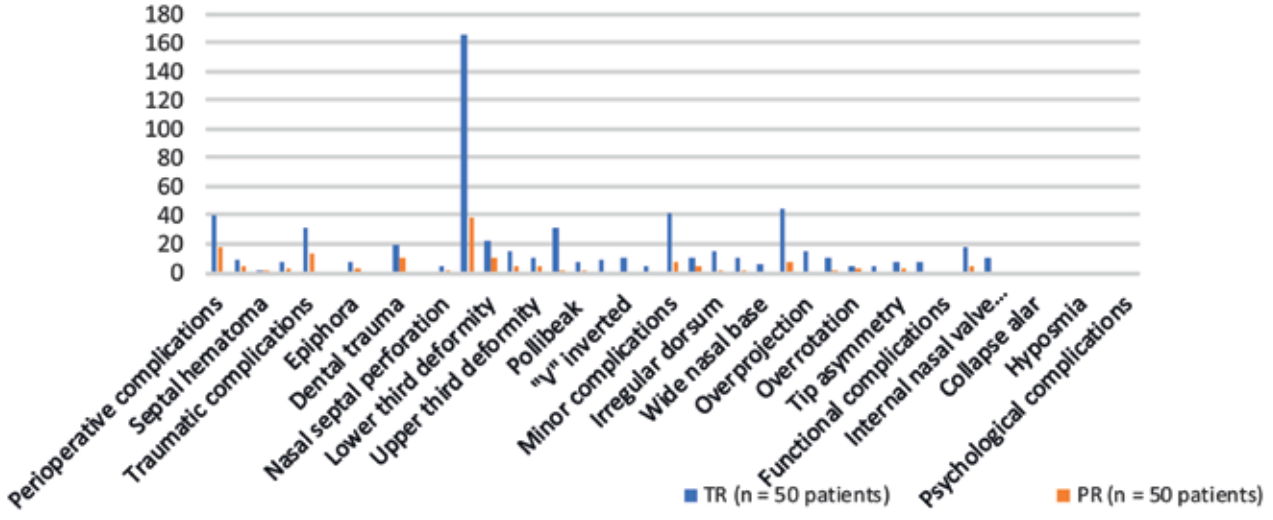

FIGURE 3. Complications of rhinoplasty

cases with temporarily hyposmia and 0 cases with anosmia were seen.

Psyhological Aspects in Rhinoseptoplasty

To assess the psychological aspects in our patients, screening questionnaire were used and, in some patients, psychiatric consult was recommended. No case had psychological problems and 90 patients were satisfied with the aspect of their nose. 10 cases (8 TR and 2 PR) required revision rhinoplasty. Septorhinoplasty is performed in a wide range of functional and aesthetic indications. Independent of the indication, the success of rhinoplasty should be based on patient's satisfaction [19, 20]. The key for a successful career as a rhinoplasty surgeon is an adequate patient selection. In relation to rhinoplasty there are two main categories of psychological disturbances [21]: psychoneurotic disorders (neurosis) exaggerate the severity; personality disorders are the most difficult to recognize. To define patients with psychologic problems it is important to use a screening questionnaire and to consult a psychiatrist. It is important to identify dismorphophobia-patients, some patients will not be satisfied even with a perfect surgical result. The most severe complication in these cases can be the patient's suicide or the assassination of the physician [21].

CONCLUSION

Nasoseptal Deformations are alterations of shape and position (lateral deviation) or development problems, in deficit (hypoplasia) or in excess (hyperplasia), with functional and aesthetic prejudice. Rhinoseptoplasty is the surgery that changes the shape, size and proportion of the nose. The motivation and results of the rhinose ptoplastic surgery are anatomical (aesthetic) and functional (improve breathing). Primary Rhinoseptoplasty procedures were continuous improved, and has two main surgical approaches: structural rhinoplasty (resection/ reconstruction) and preservation rhinoplasty (conservative). Comparing the two rhinoseptoplasty techniques we know that in traditional rhinoplasty resections and reconstruction with grafts are performed and revisions are required often; in preservation rhinoplasty it is known that the technique minimizes the need for revision and preserves the anatomy and function of the nose. In this study, 10 patients required revision rhinoplasty: the pollybeak was the indication in 4 cases (40%) (3 TR, 1 PR)of all revision rhinoplasties. Other postoperative deformities that required revision were: inverted V deformity - 2 cases, wide nasal tip - 1 case, retractions of the columella base- 1 case, and irregularities of the nasal dorsum - 2 cases (1 TR, 1 PR). Patients' satisfaction was 90%. Septorhinoplasy is a difficult procedure and the surgeon must have accurate anatomical knowledge and rich clinical experience. The risks for rhinoplasty-complications can be reduced with increasing experience. It is very important to make distinction between complication and mistake in rhinoplasty.

In the future sequential rhinoplasty should be introduced. This is a procedure that allows for switching intra-operatively from preservation to resection to structure depending on the intra-operative findings.

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